Investigation: Hydroponic Lab Experiments

Purpose: The purpose of these laboratory experiments is to measure the effects of sulfate, sulfide and different cations (magnesium, sodium, potassium and calcium) on wild rice. These experiments are conducted in greenhouses or temperature controlled growth chambers and are conducted using hydroponic methodology. Hydroponic experiments are controlled laboratory experiments that are conducted without sediment. Results from this work will be used to create dose-response curves that characterize the response of wild rice to sulfate, sulfide and various cations. These dose-response curves provide information about the toxicity of these substances to wild rice, which is one category of data needed to develop a water quality standard. The results of toxicity tests are endpoints that describe an organism's response following an exposure to a given concentration of a chemical for a specified length of time.

Principal Investigator: Dr. John Pastor, University of Minnesota-Duluth

Approach: Dr. Pastor is designing methods and conducting range finding experiments for three different growth phases of wild rice: germination, post-germination and seedlings. Plant endpoint that are currently being used for the germination experiments are germination success and root length. Plant endpoints for the post-germination experiments currently being used are dry weights and vegetative growth. Methods for performing tests with wild rice seedlings are under investigation.

Accomplishments to Date:

- Developed seed conditioning procedure for hydroponic experiments
- Conducted experiments to determine the optimum concentration of Hoagland's solution for hydroponic germination and post-germination experiments.
- Completed sulfate range-finder hydroponic experiments for wild rice germination growth stage
- Completed sulfate range-finder hydroponic experiments for wild rice post-germination growth stage

Next Steps:

- Performing dose-response experiments with sulfate for germination and post-germination phase.
- Begin sulfide range-finder hydroponic experiments for germination and post-germination phase.
- Begin range-finder experiments using wild rice seedlings.